increase from 24 hrs. after the radiation. The increase is up to 5–6 fold and lasts for more than 96 hrs. after the radiation. TK increase is less apparent, up to 2-fold, with a similar time to onset 24 hrs. and also long lasting, more than 96 hrs. A TP/DPD ratio may be roughly established, in a range of relative values 2–3 indicating that anabolism of fluorinated pyrimidines to active forms exceeds catabolic inactivation.
Conclusion: Both mRNA and protein assessments confirm the concept of an enhanced anabolic activation of fluorinated pyrimidines after an ionizing radiation. The catabolic inactivation is less strongly activated than anabolism. The enhancement is long lasting, more than 96 hrs. Therefore any timing of either daily radiation fractions or pyrimidines administrations does not seem rational. The long lasting predominanat enhancement of pyrimidines anabolism supports the currently used continuous infusion for the entire radiation period.

1415 POSTER

Distortion corrected T2 weighted MRI: implications for rectal and bladder dose sparing in prostate radiotherapy planning

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Purpose: To evaluate distortion corrected MRI as a radiotherapy planning tool for prostate cancer and assess possible rectal and bladder dose sparing as compared to CT.
Methods: Eleven men who were to be treated with radical conformal radiotherapy for localised prostate cancer had, in addition to their planning CT scan, an MRI scan under radiotherapy planning conditions, which was then corrected for geometric distortion. Radiotherapy plans were created for planning target volumes (PTV) derived from both the MRI and CT defined prostate. The bladder and rectum were defined as solid organs. The PTV consisted of the prostate and a symmetrical 5 mm margin. To treat the PTV, a plan comprising an anterior and two wedged lateral fields was used with blocks for beam shaping. The same wedge angles and beam weightings were used for MRI and CT derived plans for each patient. The PTV was treated to a notional 70 Gy in 35 fractions for each plan. Dose volume histograms were produced for the rectum and bladder.
Results: The mean volume of the prostate as defined on CT and MR was 41cc and 36cc respectively ($p = 0.009$). The mean rectal volume as defined on CT and MRI was 87 cc and 94 cc respectively ($p = 0.56$). The mean volume of the bladder as defined using CT and MRI was 284 cc and 261 cc respectively ($p = 0.5$). The predicted dose to the rectum (as defined using MRI) from plans treating each PTV is shown below. For the same dose levels, there was no difference in the proportion of bladder (as defined using MRI) receiving a given dose between plans.

Mean percentage of rectum treated to given dose.

dose	PTV CT prostate	PTV MR prostate	p value
45 Gy	23	18	0.05
50 Gy	21	16	0.05
55 Gy	19	15	0.04
60 Gy	17	12	0.03
65 Gy	14	8	0.04
70 Gy	2	1	0.08

Conclusion: Distortion corrected MRI is feasible and for the prostate, results in a smaller target volume than CT. This leads to a lower predicted proportion of the rectum treated to a given dose than with CT.

1416 POSTER

Possibility of laser-accelerated proton beams in radiotherapy

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Background: The purposes of this study are (i) to investigate distinctive features of laser ion accelerators from a clinical standpoint; (ii) to list the problems to solve when applying the accelerator to clinical setting; (iii) to simulate radiation treatment with a laser-accelerator under the condition of the currently available energy regime for eye diseases; (iv) to show future possibilities for radiotherapy with laser-accelerated proton beams.
Material and Methods: We participated in several meetings involving radiation oncologists, physicists, radiotherapy technologists under the auspices of JST and JAERI since 2003. We discussed and reviewed the related literature with the aim of developing laser-accelerated proton therapy. This is an interim report. We also developed simulation tools for laser-accelerated proton therapy: they include (1) particle-in-cell simulation (PIC) software which calculates the properties of laser-accelerated protons, (2) Monte-Carlo simulation software for dose calculations in a human body, and (3) visualization tools for the dose evaluation. We attempted to simulate laser-accelerated proton therapy for the eye diseases (uveal melanoma and age-related macular degeneration).
Results: A laser ion accelerator is expected to be compact, simple, and low cost. These features are remarkable in comparison with synchrotron or cyclotron accelerators. A laser ion accelerator has another obvious advantage of generating narrow proton beams. This feature makes it possible to treat minute targets precisely. The maximum energy of laser-accelerated protons is correlated to the laser intensity. In addition, laser-accelerated proton beams are not parallel, but diverging. In experiments, the maximum proton energy is up to several tens of MeV, and the energy spectra with a single-layer metal target are broad. It is also necessary to develop techniques to remove particles other than protons (heavy ions, electrons, gamma-rays, neutrons, etc), which are also emitted from the target. With our computer simulation, we demonstrate that eye-ball disease may be treated by the laser ion accelerated proton beams. In future, we will seek optimal parameters of laser accelerated protons.
Conclusions: There lie several problems for clinical usage with the currently available parameters; however, we can recommend that laser ion accelerator with these parameters is suitable for a minute target such as diseases within eyeball.

1417 POSTER

Re-irradiation: analysis of consecutive patients

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Background: Our aim was to analyze the results and evaluate the prognostic factors in the re-irradiation of recurrent/second primary tumors. Patients and Methods: One hundred and six patients (119 lesions) who underwent re-irradiation between June 1997 and February 2005 at the European Institute of Oncology, Milan, Italy, were retrospectively analyzed. There were 62 females and 44 males with median age of 60 years (range 22–91). Primary diagnosis included breast in 27% of patients, followed by lung cancer (20%), head and neck cancer (17%) and other primaries (36%). Re-irradiation was performed for nodal/metastatic lesions, recurrent tumor and for new primary in 84 (70%), 33 (28%) and in 2 lesions (2%), respectively. Twenty eight lesions (24%) were re-irradiated with curative intent, whereas 91 lesions (76%) re-irradiation had palliative intent. The re-irradiation dose varied from 4 to 60 Gy. Three-dimesional conformal radiotherapy (3D-CRT) was used to treat 62 lesions (52%), stereotactic radiotherapy (SRT) was used in 40 lesions (48%) and in 3 cases brachytherapy was added to 3D-CRT or SRT.
Results: Median follow-up was 10 months (range, 1–59 months). Response to treatment was observed in 71% and 63% of patients treated with curative and palliative intent, respectively. Progression was seen in 18% and 19% of patients treated with curative and palliative intent, respectively. Eleven per cent and 18% of patients among two groups were